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EXAMINER	
WERNER, BRIAN P	

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 05/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/748,138	IDE ET AL.	
	Examiner	Art Unit	
	Brian P. Werner	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 6-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-15 and 21-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *16-20* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 16, 2004 has been entered.

Response to Amendment

2. This Office Action is responsive to the amendment and arguments received on November 16, 2004. Claims 1-3 and 6-24 remain pending, with claims 16-20 being withdrawn from consideration. Therefore, claims 1-3, 6-15 and 21-24 are examined herein.

Claim Suggestions

3. In claims 21 and 22, "measuring portion" and "display portion" should be corrected to read, "measuring section" and "display sections" to be consistent with the terminology of claim 1.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-3, 6-15 and 21-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent claim 1 has been amended to recite, "the entire area displayed in the display section is comprehensively measured by the measuring section during scanning." The term "comprehensive" is defined by Webster's II, New Riverside University Dictionary (1994) as, "Broad in scope or content". Thus, the newly added claim element is construed as meaning the points on the actual objects visible in the 2D displayed area are substantially all measured by the 3D measuring section.

The original disclosure on the other hand describes a less than "comprehensive" measurement of the displayed object. That is, referring to figure 6 and to specification page 12, the entire field of view corresponding to the displayed area is represented by numeral 86 and the scanned area is represented by the darkened lines and arrows. Specification page 12, lines 23-25, states, "If the measurement of the important or required portion is completed, the measuring can be stopped (forcibly) and thereby the useless measurement can be omitted". Thus, the entire

area of the displayed image is NOT comprehensively scanned – only the important information is scanned and then the scanning stopped.

Thus, the newly added limitation drawn to "comprehensive" scanning is antithetical to the less than comprehensive scanning described at specification page 12. Since the limitation was added after the original filing date, this raises the question of whether the application was "in possession" of the now claimed invention as of the original filing date. Applicant can overcome this rejection by either amending/deleting the claim limitation or by a showing, in the original disclosure, of support for the limitation.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-3, 6, 8, 9, 11-15 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Dimsdale et al. (US 2003/0001835 A1) and Corby, Jr. et al. (US 5,805,289 A).

Dimsdale

Regarding independent claims 1 and 8, Dimsdale discloses a 3D shape measuring system (figure 1; "three dimensions" at paragraph 0001) comprising:

a measuring section measuring a 3D shape of an object by scanning the object (figure 2, numeral 210);

a display section (figure 15, numeral 1510) displaying information about an area where the scanning has been completed by the measuring section ("display and visualization of scanned points" at paragraph 0216) in accordance with a progress of the scanning ("real time 3D data acquisition" at paragraph 0216; "each point returned is displayed in the data window 1620 as it is transmitted by the FDV 10" at paragraph 0228; "while the data is arriving" at paragraph 0228; thus, each point is displayed as it is returned from the scanner and therefore the points are displayed in accordance with the progress of the scanning); and

an imaging section for taking a two-dimensional image of the object (figure 2, numeral 220; "one window 1610 (Fig. 16A) displays a video image of the target scene ..." at paragraph 0218);

wherein the display section displays information about an area where the scanning has been completed as well as an area where the scanning has not completed yet (as described above, the intensity of the reflected laser pulses is displayed "while the data is arriving" and thus, areas that have arrived are displayed and areas that have not arrived are not displayed, in accordance with the progress of the processing).

Differences

Regarding claim 1 (from which claims 2 and 3 depend), Dimsdale does not disclose displaying the two-dimensional image of the object and identifiably showing an area of the two-dimensional image where the scanning has been and has not been completed. That is, Dimsdale's 3D data and 2D images are displayed in separate windows, and thus Dimsdale does not show, on the 2D image, areas where scanning is completed.

Corby

Corby discloses a system for acquiring 3D data of an object, wherein Corby captures 3D data and a 2D image of the object (figure 1, numerals 12 and 11 respectively), comprising displaying the two-dimensional image of the object and identifiably showing an area of the two-dimensional image where the scanning has been completed ("the user should be able to view CMM point measurements pictorially, for example superimposing the points over images of the [part]" at column 3, line 9; "a monitor displays the digital images, measured 3D locations, photogrammetry locations in a superimposed manner to a user and a user interface allows the user to select objects to be measured" in at the abstract; "these points may be overlaid on he images obtained from digital camera 11" at column 7, line 6).

The Combination

It would have been obvious at the time the invention was made to one of ordinary skill in the art to overlay, or superimpose the acquired 3D data locations of Dimsdale (i.e., as depicted at Dimsdale figure 16B) onto the 2D video image of the object of Dimsdale (i.e., as depicted at Dimsdale figure 16A) as taught by Corby as described above.

Motivation

One would be motivated to modify Dimsdale in this manner in order to provide an intuitive and visual method of "keeping track of measured points as well as 'visualizing' the measurements" (Corby, column 2, line 19), as well as allowing "the user to select objects to be measured" (Corby, abstract).

Stated another way, Dimsdale currently uses the 2D image display for the user to "indicate the region to be scanned" at paragraph 0222, and Dimsdale indicates that "any number of methods" can be implemented to achieve this end. One such method is taught by Corby as described above, where the points that have already been scanned are superimposed on the 2D image. By modifying Dimsdale in the manner described above, the user would be able to view the entire object, along with the scanned point, to see if any additional points need scanning or re-scanning to ensure enough coverage for subsequent 3D modeling.

The New Limitation

Dimsdale teaches a comprehensive measurement of the entire field of view captured by the 2D camera, commensurate with the newly added limitation,

"the entire area displayed in the display section is comprehensively measured by the measuring section during scanning".

That is, "for targeting, the user is provided on the host a video representation of the scene from which he can choose a portion to be range scanned" at paragraph 0204. The video image corresponds to the area of an object or scene to be scanned. A window of video information is provided to the user "to define regions to be scanned" at paragraph 0218, whereby the "region in front of the scanner is often captured in multiple scans, rather than in one high resolution scan" at paragraph 0221. "Using a pointing device, such as a mouse, one can indicate the region to be scanned by any number of methods ..." at paragraph 0222.

While the claim limitation requires "the entire area displayed in the display section is comprehensively measured by the measuring section during scanning", the claim does NOT require that the scan be conducted all at once. Dimsdale anticipates scanning the "region in front of the scanner", which corresponds to the entire video image displayed to the operator ("video representation of the scene" at paragraph 0204), in multiple scans. However, collectively, the multiple scans result in a comprehensive scanning of the entire region. The new limitation does not preclude the collective scans anticipated by Dimsdale.

Furthermore, the concept of multiple scans is only an option of Dimsdale, not a requirement. That is, Dimsdale states, "different parts of the visible scene can be scanned at different densities" where "the region in front of the scan is often captured in multiple scans, rather than one high resolution scan" at paragraph 0221. While "can be" and "often" certainly indicates an option for multiple scans, it by no means precludes Dimsdale from the "one high resolution scan". Dimsdale, taken as a whole, anticipates "one high resolution scan" and thus the claim requirement is met this way as well.

Regarding claims 2, 3, 9 and 11-16, these limitations are met by the Dimsdale combination above as described in the previous Office Actions, the details of which will not be repeated here because these claims are not argued by the applicant, and for the sake of brevity.

Regarding claim 6, Dimsdale's display of the 3D points "while the data is arriving" (paragraph 0228) is "information" indicating a status of progress of scanning.

Regarding new claim 21, Dimsdale teaches substantially uniform measurement (As addressed above in reference to the newly added limitation, Dimsdale, taken as a whole, anticipates "one high resolution scan"; this would provide a substantially uniform resolution of the entire scanned image).

Regarding claim 22, Dimsdale displays the measuring points prior to the scanning (The video image referred to above is "exactly aligned with the scanner direction" at paragraph 0224; see "aligned with the range scanner" at paragraph 0207; The video image is an indication of what points in the image will be scanned when scanning commences; In the Dimsdale and Corby combination, the 3D data locations of Dimsdale are overlayed, or superimposed on the 2D video image of the object of Dimsdale as taught by Corby as described above.

Regarding new claims 23 and 24, Dimsdale includes in the display of finished points information about a 3D shape based on the measurement result by displaying a distance image (First, Dimsdale scans the object/scene to capture 3D information and intensity; see "The data

returned ... consist of the coordinates of the points and their intensity values"; "... the data returned lies in an ordered grid of three dimensional points 1730"; "Viewed from the scanner, these points appear as a regular rectangular grid, much like a bitmap."; "However, each point consists of its coordinates in three-space as well as the intensity of the reflected laser pulse at that location" at paragraph 0227; Then, Dimsdale teaches that "each point returned is displayed in the data window 1620 as it is transmitted" at paragraph 0228; The display window of Dimsdale is a "3-D view of the data" at paragraph 0228; In order to "to help visualize different features in the data ... each point to be color mapped from the from the intensity of the reflected laser pulse at that location" at paragraph 0228; The returned intensity is a function of the surface distance and thus corresponds to a distance image).

8. Claims 1, 8, 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ritter et al. (US 6,363,169 B1) and Corby, Jr. et al. (US 5,805,289 A).

Ritter

Regarding independent claims 1 and 8, Ritter discloses a 3D shape measuring system (figures 1, 8 and 9) comprising:

a measuring section measuring a 3D shape of an object by scanning the object (figure 1, numeral 2; figure 8, numeral S2); and

a display section (figure 24, numeral S59) displaying information about an area where the scanning has NOT been completed by the measuring section ("displaying the next shooting point of view" at column 16, line 42).

Regarding claim 10, Ritter discloses:

scanning and imaging sections changing a measuring direction and taking a two-dimensional image of the object (figure 1, numeral 2 and figure 9A; a camera is moved to various positions around the object 12 where images are taken at each position);

a detection section detecting a silhouette of the two-dimensional image (figure 9B); and

the measuring section measuring the three-dimensional shape of the object based on the detected silhouette (figures 9C and 9D).

Differences

Regarding independent claims 1 and 8, while Ritter displays information where an image needs to be taken as described above, Ritter does not disclose displaying a two-dimensional image of the object and identifiably showing an area of the two-dimensional image where the scanning has been and has not been completed.

Corby

Corby discloses a system for acquiring 3D data of an object, wherein Corby captures 3D data and a 2D image of the object (figure 1, numerals 12 and 11 respectively), comprising displaying the two-dimensional image of the object and identifiably showing an area of the two-dimensional image where the scanning has been completed ("the user should be able to view CMM point measurements pictorially, for example superimposing the points over images of the [part]" at column 3, line 9; "a monitor displays the digital images, measured 3D locations, photogrammetry locations in a superimposed manner to a user and a user interface allows the

user to select objects to be measured" in at the abstract; "these points may be overlaid on he images obtained from digital camera 11" at column 7, line 6).

The Combination

It would have been obvious at the time the invention was made to one of ordinary skill in the art to overlay, or superimpose the acquired 3D data locations of Ritter onto the 2D image of the object as taught by Corby as described above.

Motivation

One would be motivated to modify Ritter in this manner in order to provide an intuitive and visual method of "keeping track of measured points as well as 'visualizing' the measurements" (Corby, column 2, line 19), as well as allowing "the user to select objects to be measured" (Corby, abstract).

Stated another way, Ritter currently displays "the next shooting point of view" at column 16, line 42. As modified, the points that have already been taken are superimposed on a 2D image of the object, where the user would be able to view the entire object, along with the scanned points, to see if any additional points need scanning or re-scanning to ensure enough coverage for subsequent 3D modeling.

The New Limitation

Ritter teaches a comprehensive 3D measurement of the entire object of interest, as indicated in figure 25.

Corby teaches displaying a two-dimensional image of the object being scanned and identifiably showing an area of the two-dimensional image where the scanning has been completed ("the user should be able to view CMM point measurements pictorially, for example superimposing the points over images of the [part]" at column 3, line 9; "a monitor displays the digital images, measured 3D locations, photogrammetry locations in a superimposed manner to a user and a user interface allows the user to select objects to be measured" in at the abstract; "these points may be overlaid on he images obtained from digital camera 11" at column 7, line 6).

The Ritter and Corby combination described above adds the display of Corby to the Ritter system to display a 2D image of the object that is comprehensively scanned by Ritter, whereby 3D scanned points are identifiably displayed. Thus, given that Ritter comprehensively scans the object, and Ritter displays a 2D image of the scanned object as modified by Corby, the Ritter and Corby combination meets the newly added limitation of,

"the entire area displayed in the display section is comprehensively measured by the measuring section during scanning."

Regarding new claim 21, Ritter teaches substantially uniform measurement (Referring to figure 25, images are captured from various positions around the object 12 using the same camera; thus, the entire scan would be of substantially the same quality or resolution).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Dimsdale et al. (US 2003/0001835 A1) and Corby, Jr. et al. (US 5,805,289 A) as applied to claim 6 above, and further in combination with Akins et al. (US 5,309,555 A).

Akins discloses a system in the same problem solving area of indicating the progress of an image processing task, comprising displaying a message indicating the degree of progress as a percentage ("a status message at the bottom of the Telesketch primary window displays 'percentage done" progress indicators so the users can see how far along the transmission has progressed" at column 12, line 40).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add a message to the user of Dimsdale to indicating a degree of progress as a percentage as taught Akins. That is, one would be motivated to added the progress percentage indication so that the user of Dimsdale can see how far along the scanning has progressed (as described by Akins at column 12, line 40), thereby providing the user with an intuitive measure of the progress already made.

Response to Arguments

10. On page 8 of the arguments received on November 16, 2004, applicant states, "In the present application, the entire area displayed in the display section is comprehensively measured by the measuring section during scanning. This is not the case in JP05-107051 A, Dimsdale et al. Ritter et al. and Corby, Jr. et al., considered alone or in combination." This is the entirety of the arguments.

The examiner disagrees. The rejections above have been modified to address the new limitation. In addition, the new limitation raises a question of "possession", as described in the 112 rejection above.

Suggestion for Allowances

11. Based on new claim 22, the examiner suggests adding the following allowable subject matter to claims 1 and 8:

"The display section displays all the measuring points prior to the scanning by superimposing visual indicators of the points on the two-dimensional image, and displays a program status of the scanning along with the progress of the scanning by changing the display state of the measuring points that were displayed in advance."

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Werner whose telephone number is 571-272-7401. The examiner can normally be reached on M-F, 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian Werner
Primary Examiner
Art Unit 2621
May 23, 2005

BRIAN WERNER
PRIMARY EXAMINER